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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Mostafazadeh et al.

Attorney Docket No.:
NSC1P225R/P03405D1-R1

Application No.: 10/044,162

Examiner: Pham, T.

Filed: January 11, 2002

Group: 2823

Title: PLASTIC PACKAGE WITH EXPOSED
DIE AND METHOD OF MAKING SAME

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this correspondence is being transmitted by facsimile to fax number (571) 273-8300 to the U.S. Patent and Trademark Office on September 27, 2006.

Signed: 

Lara M. Nelson

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This appeal is from the Final Office Action dated June 29th, 2006. In that Office Action, all of the pending claims were rejected on the basis of a combination of two references. That is, Lin (U.S. Patent No. 5,200,362) in combination with Ogawa (U.S. Patent No. 5,252,855). The Final Office Action set forth a new grounds of rejection and therefore the rejections set for in the preceding Office Actions are not discussed herein. A response to the Final Office Action was fax filed on July 12th, 2006. The currently pending claims are presented in the same paper. It is noted that this is a reissue application and therefore the claims are presented in that response in the format that is required for reissue applications. This is the second time a pre-appeal brief request for review has been filed.

The Present Invention

The present invention relates to lead frame based methods of packaging integrated circuits. More particularly, the lead frame and a die are mounted on an adhesive tape. (See, e.g. Fig. 5). After electrically connecting the die to the lead frame, a plastic casing is formed over the die and lead frame. (See, e.g., Fig. 6). The tape prevents the plastic casing (e.g. molding) material from flowing beneath the lead frame. After the casing has been formed, the tape may be removed. With this arrangement, the bottom surface of the lead frame (which was attached to

the adhesive tape) remains exposed at the bottom surface of the package and the exposed leads form the electrical contacts (indeed the only electrical contacts) for the package.

Lin does not disclose a lead frame

All of the claims in the present application are specifically directed at **lead frame** based methods of packaging integrated circuits. Although the exact wording of the claims vary somewhat, each independent claim specifically requires the step of: (1) "providing" or "forming" a lead frame; and (2) mounting the lead frame on an adhesive strip. In the outstanding final rejection, it is asserted that Lin discloses the step of "forming a flat lead frame 13 including ...". The assertion that Lin discloses the step of forming a **lead frame** is respectfully traversed.

The Lin reference contemplates the adhesion of a conductive foil or the deposition of a conductor material onto a flexible "transfer film". See the paragraph beginning on at Col. 2, line 33 of the Lin patent. It is respectfully submitted that the significant distinctions between the foil based technologies discussed by Lin and the lead frame technology of the present invention are widely understood to those skilled in the art and that such people would understand the term lead frame to exclude thin metal foils/sheets/deposited conductive layers, that are disclosed by Lin.

To support the assertion that Lin contemplates the use of lead frames, the advisory action dated August 24th, 2006 cites a portion of a sentence that occurs late in the paragraph referenced above (at Col. 2, lines 51 – 54) which reads:

In yet another embodiment, a pattern of traces is formed from a thin sheet of metal and that pattern of traces is then laminated to the transfer film.

The advisory action takes the position that the thin sheet of metal is a lead frame. Although lead frames are formed from relatively thin sheets of metal (e.g., copper), they are not the thin sheets of metal that are discussed in the '362 patent. Generally, lead frames are known to be **self-supporting sheet metal frameworks** that are used in semiconductor packaging. There is a large installed base of equipment suitable for handling lead frames and particularly, the lead frame strips or panels that individual lead frames are part of. More particularly, as is notoriously well known in the art, lead frames strips or panels generally have skirts or bars that support the leads and rails or other structures that may be used by the handling equipment during fabrication and packaging. Such skirts and rails are trimmed away at some point in the packaging process (generally after the package has been molded in molded packages).

In contrast, as can be seen in Lin's Figs. 8 and 9, and as explained in the accompanying descriptions, in all of the embodiments shown in the Lin reference, the transfer film (element 12 of Fig. 8, element 50 of Fig. 9) is the component that is handled by handling equipment. This is an approach that is appropriate for use in foil based packaging and is a very different approach

than that used in lead frames. Nothing suggests that the pattern of traces that is formed from the thin sheet of metal (as described at Col. 2, lines 51 – 54) is a “lead frame” as it is believed that the term is commonly understood in the art. That is, nothing suggests that the “pattern of traces” that are laminated to the transfer film is a **self-supporting structure that can be independently handled** in the pre-molded state as would be inherent in the claimed “lead frame” as that term is commonly understood in the art.

It is reiterated that lead frames are widely used within the semiconductor packaging industry. There is a large installed base of equipment suitable for handling lead frames. In contrast, foil or taped based processes (which are also generally known within the industry) are generally significantly more expensive than lead frame based processes. Accordingly, it is not surprising that they are far less widely used than lead frame based packaging. The equipment used for handling tapes and foils during assembly is generally different than the equipment used for handling lead frames. Therefore, it should be appreciated that a very significant advantage of the present invention is that the described devices can be fabricated using an inexpensive technology (i.e., lead frames) that is quite familiar to many people in the art using much of their existing equipment. Given the significant differences between lead frame based packaging and the foil / thin film approach described by Lin, it is respectfully submitted that nothing in the Lin reference suggest the use of a lead frame on the described transfer film.

Since the outstanding rejection on the basis of Lin as the primary reference is based primarily on the incorrect assumption that Lin teaches the use of lead frames in their described process, it is respectful submitted that the outstanding rejection based on the combination of Lin and Ogawa must be withdrawn for at least that reason.

The Rejection using Ogawa as the primary reference.

The outstanding rejection also makes a reverse combination in which the Ogawa reference is used as the primary reference. The Ogawa reference has been extensively discussed in earlier prosecution. Ogawa is directed at the fabrication of a lead frame having a support member (2, 8) that is secured to the bottom surface of the lead frame 1. The support member serves as a support for the die 4 both during assembly and **when the lead frame is eventually used in a package**. In the embodiment illustrated in Figs. 1 and 3, the support member is a resin film or plate 2 (e.g. polyimide). In the embodiment illustrated in Fig. 4, the support is a metal plate 8. In either event, as would be readily appreciated by anyone of ordinary skill in the art, the support member (resin film) is **intended to be integrated into the package**. This type of die support structure was well known at the time of Ogawa and such supporting structures were normally fully encased by the plastic molding material in the finalized package.

As currently presented independent claim 1 requires, inter alia:¹

mounting the lead frame and an integrated circuit die onto a strip of adhesive tape such that a lower surface of the die contacts the adhesive tape and the die is located in the central opening, and the lower surface of the lead frame also contacts the adhesive tape;

* * *

forming a plastic casing over an upper surface of the die and the upper surface of the lead frame wherein the plastic casing comes into contact with the adhesive tape such that a lower surface of the plastic casing is substantially co-planar with the lower surfaces of the lead frame and the die; and

removing the adhesive tape after forming the plastic casing to expose the lower surfaces of the die and the lead frame, whereby exposed portions of the lead frame form the only externally accessible I/O contacts for the package and plastic material fills at least portions of gaps between adjacent leads, such that the lower surface of the package is substantially co-planar and includes exposed portions of the plastic casing, the lead frame and the die.

The outstanding office action acknowledges that Ogawa does not disclose the step of forming a plastic casing over the die and lead frame in a manner that leaves the lower surface of the lead frame exposed and substantially coplanar with the lower surface of the plastic casing. The office action then relies on Lin for the propositions that it would be obvious to modify Ogawa to: (a) form a plastic casing over the lead frame in a manner that leaves the bottom surface of the lead frame exposed; and (b) remove the resin film 2 taught by Ogawa.

It is respectfully submitted that those skilled in the art at the time of the present invention would not have been motivated by any reasonable combination of the Ogawa and Lin references to make the combination proposed by the outstanding rejection (or the specific combinations set forth in independent claims 1 and 7). As has been argued extensively in earlier responses, the resin member 2 disclosed by Ogawa is very clearly intended to be a permanent structure and its removal would completely defeat the purpose of Ogawa reference. It is well settled that in order to support a prima facie case of obviousness, there must be some suggestion or motivation (either in the references themselves or in the knowledge generally available to one of ordinary skill in the art) to modify a reference or to combine the teaching of two (or more) references. See, MPEP §2143. It is also well established that if a proposed modification would render the prior art being modified unsatisfactory for its intended purpose, then, as a matter of law, there can not be a suggestion or motivation to make the proposed modification. MPEP §2143.01(v). In view

¹ Independent Claim 7 requires similar steps although the relevant wording of the claim varies somewhat.

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of the fact that removing the resin member would completely defeat the purpose of Ogawa, it is respectfully submitted that nothing in Lin would motivate those skilled in the art to make the combination asserted in the outstanding rejection. Accordingly, it is respectfully submitted that a prima facie case of obviousness has not been made and that the outstanding rejections based on the use of Ogawa should be withdrawn for at least this reason.


The Other Claims

The language of independent claims 7 and 15 vary somewhat from the language of independent claim 1 discussed above. However, the arguments made above are equally applicable to independent claims 7 and 15 and the dependent claims.

Conclusion

In view of the foregoing, it is respectfully submitted that all pending claims are patentable over the art of record and that outstanding rejections should be withdrawn. Should the conferees have any questions or concerns regarding the present application, they are encouraged to contact the undersigned at the telephone number set out below.

Respectfully submitted,
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